BIOLOGICAL EVALUATION
Spruce Budworm Infestation

National Forest and Adjacent Indian,
State, and Private Lands

New Mexico

1964

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This biological evaluation of the spruce budworm infestation on some 480,000 acres of infested mixed conifer type in New Mexico is based on a spruce budworm egg mass survey on thirteen permanent plots. The egg mass survey was made during August and September 1964.

The infestation comprises four major entomological units (see map). The Eagle Nest Unit east of the Carson National Forest covers 250,000 acres of State and private land; the Chama Unit west of the Carson National Forest comprises 100,000 acres of State and private land; the Glenwood Unit on the Gila National Forest includes 40,000 acres; and the Cloudcroft Unit on the Lincoln National Forest covers 90,000 acres.

The 1965 spruce budworm population will be variable. Populations in the Eagle Nest and Cloudcroft Units are rising and defoliation of the 1965 growth is expected to be generally moderate with some areas sustaining severe defoliation. 1/ Populations on the Chama Unit are generally decreasing and defoliation is expected to be light except in isolated drainages where it will be heavy. The population is low in the Glenwood Unit and very little damage is expected in 1965.

1/ Light, 0 to 25% new growth defoliated
Moderate, 26 to 50% new growth defoliated
Heavy, 51 to 75% new growth defoliated
Severe, 76 to 100% new growth defoliated

General Information

Insect - Spruce budworm Choristoneura fumiferana (Clem.)

Hosts - Douglas-fir, Pseudotsuga menziesii (Mirb.) Franco
White fir, Abies concolor (Gord. & Glend.) Lindl.
Corkbark fir, Abies lasiocarpa var. Arizonica (Merriam) Lemm.
Blue spruce, Picea pungens Engelm.
Engelmann spruce, Picea engelmannii Parry

Type of damage - The Chama Unit is typified by extensive tree kill, tree deformation, and many deteriorated, stagnated stands of reproduction. The worst areas in the Eagle Nest Unit are typified by severe top injury, some top kill and deteriorating stands of second growth. The Cloudcroft Unit has sustained one year of heavy damage in localized areas. Light defoliation with no significant damage resulting has occurred on the Glenwood Unit.

Extent and location of infestation - A total of 480,000 acres of mixed conifer is infested on four widely scattered localities in New Mexico. Three-fourths of the infested area is on private and State land; the rest is on National Forest land.

Sampling Method

Each sample plot consisted of five dominant or co-dominant Douglas-fir trees. Two men, using a 30-foot pole with pruning saw, removed two lower mid-crown branches. Foliage from one side of each branch was clipped and discarded. The remaining foliage was then placed in a triangle, measured and placed in numbered cotton bags. Thus, the equivalent of one entire branch per tree, or five branches per plot, was sampled.

A total of 89,685 square inches of foliage was examined from the plots, for an average of approximately 6,900 square inches per plot. Needles with spruce budworm egg masses were removed from the foliage and tallied by plot. The egg masses were then grouped as either old or new. The new egg masses were then examined for egg parasitism.

Results

Population trends for 1965 were determined by comparing the number of 1964 new egg masses with the new egg masses of the 1963 evaluation. This comparison is made for each of the 13 plots in Table 1. Egg parasitism is increasing but is still too low to sway the population trend. No egg parasitism was recorded in the 1963 evaluation.

Table 1. Summary of 1963 and 1964 Spruce Budworm Egg Mass Survey Data from 13 Douglas-fir Plots in New Mexico.

Unit Sample Plot	Unparasitized Egg Masses Per 1,000 Sq. In. Foliage		Parasitized Egg Masses Per 1,000 Sq. In. Foliage
	1963	1964	1964
Eagle Nest Unit			
Cyphers Mine	24.2	75.1	0.6
Garcia Peak	2.5	12.4	0.0
LeBus Bros.	5.3	18.5	0.0
State Wildlife Area	9.9	13.9	0.2
Chama Unit			
Lobo Lodge	3.9	1.8	0.0
Willow Creek	9.4	3.1	0.0
Canones Creek	1.5	0.5	0.0
Brazos Box	17.9	34.1	0.2
Cloudcroft Unit			
Sacramento Lookout	13.8	25.5	<0.1
Nelson Canyon	5.1	10.1	0.1
Mescalero Indian Reservation	0.0	0.2	0.0
Glenwood Unit			
Spider Creek Saddle	--	0.0	0.0
Helispot Holt Mtn.	--	0.0	0.0

Eagle Nest Unit. - Egg mass densities increased on all four plots in this Unit. Increases over last year range from 40 percent on the State Wildlife Area plot to nearly 400 percent on the Garcia Peak plot. Defoliation of new growth in 1965 is expected to be moderate except in localized areas, such as Cyphers Mine, where it is expected to be severe. Severe weakening, caused by several years of defoliation, is expected to result in increasing top-kill.

Chama Unit - Egg mass densities continued to decline except on the Brazos Box plot, which increased nearly 100 percent over 1963. Light defoliation is expected in 1965 except in the Brazos drainage where it will be heavy.

Cloudcroft Unit - Egg mass densities have risen 100 percent over last year on the Sacramento Lookout and Nelson Canyon plots. Not only has the population intensified, but it has spread over an additional 40,000 acres. Defoliation of the 1965 growth is expected to be severe in localized areas and moderate to light in other areas.

Glenwood Unit - No egg masses were found on the two plots in this Unit. Defoliation is expected to be light in 1965.

Discussion

The infestation on the Cloudcroft Unit is the only immediate threat to National Forest lands in Region 3. This outbreak must be carefully watched for two reasons. First, it is rapidly gaining momentum, both in spread and intensity; secondly, it is already damaging the Christmas tree crop and degrading scenic areas on the Cloudcroft Ranger District. If injury by the budworm progresses to the point where forest resources are dangerously threatened, the area must be treated.

Heavy defoliation is expected in the Eagle Nest Unit during the spring of 1965. Top-killing (scattered at present) and mortality in the understory will increase rapidly if the present trend continues. The land manager concerned should consider direct suppression measures if further damage is to be prevented.

While some of the area in the Chama Unit appears to be recovering, pockets of high population still exist. If this outbreak is indeed being controlled by natural factors, it should be noted that the cost has been high. Several hundred thousand trees have been killed, increment has been lost, tree deformation is widespread and some young stands are badly deteriorated. This area will continue to have poor growth and an unhealthy appearance for several years. Control in this Unit should not be necessary if the budworm population continues at its present trend.

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SPRUCE BUDWORM INFESTATION

NATIONAL FOREST AND ADJACENT INDIAN, STATE, AND PRIVATE LANDS

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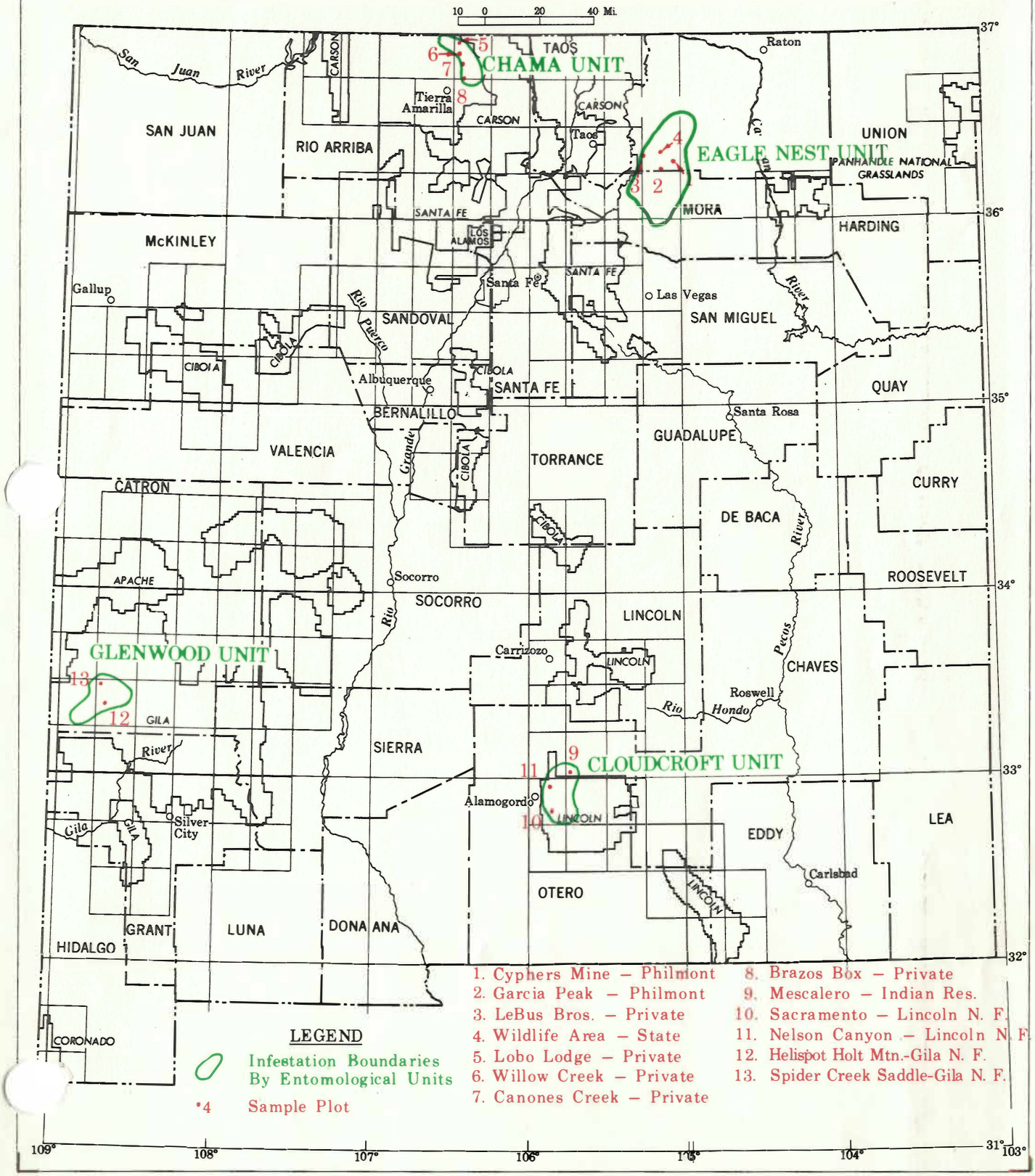

LEGEND

Infestation Boundaries By Entomological Units

•4 Sample Plot

1. Cyphers Mine – Philmont
2. Garcia Peak – Philmont
3. LeBus Bros. – Private
4. Wildlife Area – State
5. Lobo Lodge – Private
6. Willow Creek – Private
7. Canones Creek – Private
8. Brazos Box – Private
9. Mescalero – Indian Res.
10. Sacramento – Lincoln N. F.
11. Nelson Canyon – Lincoln N. F.
12. Helispot Holt Mtn.-Gila N. F.
13. Spider Creek Saddle-Gila N. F.